

**CUTTING OR BREAKING TOOL  
AS WELL AS CUTTING INSERT FOR THE LATTER**



The invention relates to a cutting insert for a cutting or breaking tool, which can be mounted in a tool holder that can be rotated about a longitudinal axis, especially to a lathe chisel, as defined in the introductory portion of claim 1, as well as to such a cutting or breaking tool itself, as defined in claim 5.

Such tools are rotatably mounted in tool holders, which are usually fastened to the surface of a rotating roller. In the case of the tools known in practice, the heads of the tool bodies and the intermediate regions of the cutting inserts are conical and constructed with a round cross section. A different hard alloy insert, described in the WO 94/13932, has a ribbed intermediate region, as a result of which an improved spatial behavior is to be attained, since the regions between the ribs serve to carry away the material that has been cut off or broken off. However, because the material to be processed generally contains tar, the spaces between the ribs clog up quickly, so that the improved spatial behavior exists for only a short time.

It is therefore an object of the invention to provide a generic cutting insert as well as a generic cutting or breaking tool, which has improved and durable spatial as well as cutting and breaking properties.

Pursuant to the invention, this objective is accomplished by a cutting insert with the distinguishing features of claim 1 and a cutting and breaking tool with the distinguishing features of claim 5.

Due to the spatial areas, which are disposed distributed over the periphery of the transition region of the cutting insert and which, in comparison with

a cutting insert of circular cross section, are disposed in secant fashion, free regions are formed between the edges of these spatial areas adjoining one another. As the tool is rotated, waste material is ejected from these free regions and transported out of the working region without these regions sticking together or becoming clogged. Since the edges are constructed as spatial and cutting edges, they have an additional peeling action during the rotation of the tool. This peeling action reinforces the cutting action of the tip of the cutting insert, so that the depth of penetration and the service life of the tool as a whole are improved and, as a result, the lathe chisel remains sharp longer.

Further advantages and details arise out of the dependent claims and out of the embodiments of the invention, which are explained in the following and shown in the drawing, in which

Figure 1a shows a side view of an inventive cutting insert,

Figure 1b shows a section along the line Ib - Ib in Figure 1a,

Figure 1c shows a view from the direction Ic in Figure 1a,

Figure 2a shows the object of Figure 1a in a different embodiment,

Figure 2b shows a section along the line IIb - IIb in Figure 2a,

Figure 3 shows a side view of an inventive tool with cutting insert,

Figure 4a shows the object of Figure 3 in a different embodiment and

Figure 4b shows a view from the direction IVb in Figure 4a.

The cutting insert 1, shown in Figures 1a to 1c, has a conical point 2, a transition region 3 and a foot 4. The peripheral area of the transition region 3 is formed by six spatial areas 5, which adjoin one another forming spatial and cutting edges 6. The spatial areas 5 are inclined towards the longitudinal axis 7 of the cutting inserts 1 in such a manner, that they enclose an acute angle  $\alpha$  with the latter, which preferably is less than  $45^\circ$ . As a result, the cutting insert 1 has an essentially conical shape, which has a hexagonal cross section in the case of the embodiment shown. The conical shape of the cutting insert 1, achieved by the inclination of the spatial surfaces 5, provides it with good stability. With regard to reducing the wear of the cutting insert, it is advantageous to have the angle  $\alpha$  as small as possible, in order to settle as much material as possible close to the tip 2. As shown, the spatial areas 5 are rounded as they change over into the foot 4. This is also advantageous with respect to stability.

As shown in Figure 2, the spatial areas 5 can also be curved concavely, as a result of which the spatial and cutting edges 6 can be constructed sharper and larger free spaces 8 for accommodating and removing waste material are formed. For both embodiments, the spatial and cutting edges 6 act as scoops for removing material and, furthermore, provide a resistance to the material, which leads to a uniform rotation and therefore to a uniform wear of the tool. In order to improve the penetration behavior further, the edges 9, obtained between the tip 2 and the spatial areas 5, can also be constructed as sharp cutting edges.

In Figure 3, a lathe chisel is shown with a conventional tool body 10 and an inventive cutting insert 1. The tool body 10 has an essentially cylindrical shaft 11 for rotatably mounting it in a tool holder, and a head 12, with which the cutting insert 1 is connected preferably by means of solder.

Figure 4 shows a different embodiment of the tool, for which the head 12 of the tool body 10, like the cutting insert 1, also has areas 13, which adjoin one

another forming edges 14, distributed over its periphery. Due to this shape of the head 12 of the tool body 10, the cutting, waste removal and rotational behavior can be improved further particularly when the tool penetrates deeply into the material being processed. This effect is reinforced further if, as can be seen especially in Figure 4b, the edges 14 of the head 12 are disposed offset to the spatial and cutting edges 6 of the transition region of the cutting insert 1. By these means, the waste material is caused to move helically, which favors its removal, and a uniform rotation of the tool is ensured in that an edge 6, 14, which causes the tool to rotate, is present over the peripheral surface of the tool in each region either at the top at the cutting insert 1 or lower at the head 12 of the tool body 10.